What is claimed is:

1. A process for the production of a component of a highly heat-resistant inorganic fiber-bonded ceramics (A) composed of

(i) inorganic fibers comprising (a) and/or (b),

(a) an amorphous substance comprising Si, M, C and O (M is Ti or Zr),

(b) an assembly of (1) crystalline fine particles of β-SiC, MC and C and (2) amorphous substances of SiO_2 and MO_2,

(ii) an inorganic substance comprising (c) and/or (d) and optionally comprising (e) dispersed therein, which substance fills interstices between the above inorganic fibers,

(c) an amorphous substance comprising Si and O and optionally comprising M,

(d) a crystalline substance comprising crystalline SiO_2 and MO_2,

(e) a crystalline fine particle inorganic substance comprising MC having a particle diameter of 100 nm or less, and

(iii) boundary layers with thickness of 1 to 100nm comprising carbon as a main component and optionally comprising crystalline particles of MC having a particle diameter of 100 nm or less dispersed therein, the boundary layers being formed on the surfaces of the inorganic fibers,

which process comprises

preparing a laminate material (B) of inorganic fibers comprising an internal layer and a surface layer each, as a raw material,

the internal layer being composed of an inorganic substance containing (a) and/or (b),

(a) an amorphous substance comprising Si, M, C and

O (M is Ti or Zr),

(b) an assembly of (1) crystalline ultrafine particles of β-SiC, MC and C and (2) amorphous substances of SiO_2 and MO_2,

the surface layer being composed of an inorganic substance containing (c) and/or (d),

(c) an amorphous substance comprising Si and O and optionally comprising M,

(d) a crystalline substance comprising crystalline SiO_2 and/or MO_2,

the surface layer having a thickness T (unit: μm) satisfying T = aD (in which a is a number in the range of from 0.023 to 0.053 and D is a diameter (unit: μm) of the inorganic fiber),

disposing the laminate material (B) around a carbon core having a predetermined shape to produce a preliminary shaped material,

setting the preliminary shaped material in a carbon die,

covering the preliminary shaped material with a carbon powder, and then,

loading a pseudo-isotropic pressure on the preliminary shaped material by hot-pressing in an inert gas atmosphere at a temperature in the range of from 1,500 to 2,000 °C under a pressure of 10 to 100 MPa.

2. A process for the production of a component of a highly heat-resistant inorganic fiber-bonded ceramics (A) composed of

(i) inorganic fibers comprising (a) and/or (b),

(a) an amorphous substance comprising Si, M, C and O (M is Ti or Zr),

(b) an assembly of (1) crystalline fine particles of β-SiC, MC and C and (2) amorphous substances of SiO_2 and MO_2,

(ii) an inorganic substance comprising (c) and/or (d) and optionally comprising (e) dispersed therein, which substance fills interstices between the above inorganic fibers,

(c) an amorphous substance comprising Si and O and optionally comprising M,

(d) a crystalline substance comprising crystalline SiO_2 and MO_2,

(e) a crystalline fine particle inorganic substance comprising MC having a particle diameter of 100 nm or less, and

(iii) boundary layers with thickness of 1 to 100nm comprising carbon as a main component and optionally comprising crystalline particles of MC having a particle diameter of 100 nm or less dispersed therein, the boundary layers being formed on the surfaces of the inorganic fibers,

which process comprises

preparing a laminate material (B) of inorganic fibers comprising an internal layer and a surface layer each, as a raw material,

the internal layer being composed of an inorganic substance containing (a) and/or (b),

(a) an amorphous substance comprising Si, M, C and O (M is Ti or Zr),

(b) an assembly of (1) crystalline ultrafine particles of β-SiC, MC and C and (2) amorphous substances of SiO_2 and MO_2,

the surface layer being composed of an inorganic substance containing (c) and/or (d),

(c) an amorphous substance comprising Si and O and optionally comprising M,

(d) a crystalline substance comprising crystalline SiO_2 and/or MO_2,

the surface layer having a thickness T (unit: μm) satisfying T = aD (in which a is a number in the range of from 0.023 to 0.053 and D is a diameter (unit: μm) of the inorganic fiber),

disposing the laminate material (B) on a surface of a component which is obtained by processing a bulk material of the inorganic fiber-bonded ceramics to a size smaller than a predetermined component size, to produce a preliminary shaped material,

setting the preliminary shaped material in a carbon die,

covering the preliminary shaped material with a carbon powder, and then,

loading a pseudo-isotropic pressure on the preliminary shaped material by hot-pressing in an inert gas atmosphere at a temperature in the range of from 1,500 to 2,000 °C under a pressure of 10 to 100 MPa.

3. A process for the production of a component of a highly heat-resistant inorganic fiber-bonded ceramics (C) comprising inorganic fibers which are composed mainly of a sintered structure of SiC, contain 0.01 to 1 % by weight of oxygen and at least one kind of metal atoms selected from the class consisting of metal atoms of the 2A, 3A and 3B groups of the periodic table and are bonded extremely nearly in the closest packing state and boundary layers with thickness of 1 to 100nm composed mainly of carbon which are present between the fibers,

which comprises

preparing a laminate material (D) of infusible fibers or inorganic fibers,

the infusible fibers being obtained by

(a) a first step of adding a compound containing at least one kind of metal atoms selected from the class consisting of the 2A, 3A and 3B groups of the periodic table to a polysilane in which the molar ratio of carbon atoms to silicon atoms is at least 1.5 or a heat reaction product thereof and allowing the resultant mixture to react under heat in an inert gas atmosphere, to prepare a metal-element-containing organosilicon polymer,

(b) a second step of melt-spinning the metal-element-containing organosilicon polymer to obtain spun fibers, and

(c) a third step of heating the spun fibers at 50 to 170°C in an oxygen-containing atmosphere to prepare the infusible fibers,

the inorganic fibers being obtained by

(d) a forth step of converting the above infusible fibers to inorganic fibers in an inert gas,

disposing the laminate material (D) around a carbon core having a predetermined shape, to prepare a preliminary shaped material,

setting the preliminary shaped material in a carbon die,

covering the preliminary shaped material with a carbon powder, and then,

loading a pseudo-isotropic pressure on the preliminary shaped material by hot-pressing in vacuum or in an atmosphere containing at least one component selected from the group consisting of an inert gas, a reducing gas and hydrocarbon at a temperature in the range of from 1,700 to 2,200 °C under a pressure of 10 to 100 MPa.

4. A process for the production of a component of a highly heat-resistant inorganic fiber-bonded ceramics (C) comprising inorganic fibers which are composed mainly of a sintered structure of SiC, contain 0.01 to 1 % by weight of oxygen and at least one kind of metal atoms selected from the class consisting of metal atoms of the 2A, 3A and 3B groups of the periodic table and are bonded extremely nearly in the closest packing state and boundary layers with thickness of 1 to 100nm composed mainly of carbon which are present between the fibers,

which comprises

preparing a laminate material (D) of infusible fibers or inorganic fibers,

the infusible fibers being obtained by

(a) a first step of adding a compound containing at least one kind of metal atoms selected from the class consisting of the 2A, 3A and 3B groups of the periodic table to a polysilane in which the molar ratio of carbon atoms to silicon atoms is at least 1.5 or a heat reaction product thereof and allowing the resultant mixture to react under heat in an inert gas atmosphere, to prepare a metal-element-containing organosilicon polymer,

(b) a second step of melt-spinning the metal-element-containing organosilicon polymer to obtain spun fibers, and

(c) a third step of heating the spun fibers at 50 to 170°C in an oxygen-containing atmosphere to prepare the infusible fibers,

the inorganic fibers being obtained by

(d) a forth step of converting the above infusible fibers to inorganic fibers in an inert gas,

disposing the laminate material (D) on a surface of a component which is obtained by processing a bulk material

of the inorganic fiber-bonded ceramics to a size smaller than a predetermined component size, to produce a preliminary shaped material,

setting the preliminary shaped material in a carbon die,

covering the preliminary shaped material with a carbon powder, and then,

loading a pseudo-isotropic pressure on the preliminary shaped material by hot-pressing in vacuum or in an atmosphere containing at least one component selected from the group consisting of an inert gas, a reducing gas and hydrocarbon at a temperature in the range of from 1,700 to 2,200 °C under a pressure of 10 to 100 MPa.

5. A component of an inorganic fiber-bonded ceramics (A) composed of

(i) inorganic fibers comprising (a) and/or (b),

(a) an amorphous substance comprising Si, M, C and O (M is Ti or Zr),

(b) an assembly of (1) crystalline fine particles of β-SiC, MC and C and (2) amorphous substances of SiO_2 and MO_2,

(ii) an inorganic substance comprising (c) and/or (d) and optionally comprising (e) dispersed therein, which substance fills interstices between the above inorganic fibers,

(c) an amorphous substance comprising Si and O and optionally comprising M,

(d) a crystalline substance comprising crystalline SiO_2 and MO_2,

(e) a crystalline fine particle inorganic substance comprising MC having a particle diameter of 100 nm or less, and

(iii) boundary layers with thickness of 1 to 100nm

comprising carbon as a main component and optionally comprising crystalline particles of MC having a particle diameter of 100 nm or less dispersed therein, the boundary layers being formed on the surfaces of the inorganic fibers,

wherein the component has a curved surface and/or an inclined surface and the fibers are aligned in a surface shape of the curved surface and/or the inclined surface.

6. A component of an inorganic fiber-bonded ceramics (C) comprising inorganic fibers which are composed mainly of a sintered structure of SiC, contain 0.01 to 1 % by weight of oxygen and at least one kind of metal atoms selected from the class consisting of metal atoms of the 2A, 3A and 3B groups of the periodic table and are bonded extremely nearly in the closest packing state and boundary layers with thickness of 1 to 100nm composed mainly of carbon which are present between the fibers,

wherein the component has a curved surface and/or an inclined surface and the fibers are aligned in a surface shape of the curved surface and/or the inclined surface.